09:45:10 OCA PAD INITIATION - PROJECT HEADER INFORMATION 05/25/88

Active

Project #: G-42-605 Cost share #: Rev #: 0
Center # : R6328-1A0 Center shr #: OCA file #:
Work type : RES
Contract#: 5 R01 AG06858-02 Mod #: Document : GRANT
Prime #: Contract entity: GTRC

Subprojects ? : N
Main project #:

Project unit: PSYCH Unit code: 02.010.154
Project director(s):
SALTHOUSE T A PSYCH

Sponsor/division names: DHHS/PHS/NIH / NATL INSTITUTES OF HEALTH
Sponsor/division codes: 108 / 001

Award period: 880601 to 890531 (performance) 890831 (reports)

Sponsor amount	New this change	Total to date
Contract value	126,234.00	126,234.00
Funded	126,234.00	126,234.00
Cost sharing amount		0.00

Does subcontracting plan apply ?: N

Title: EFFECTS OF AGE ON SPATIAL ABILITIES AMONG ENGINEERS

PROJECT ADMINISTRATION DATA

OCA contact: E. Faith Gleason 894-4820

Sponsor technical contact

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BLDG 31, ROOM 5C-07
BETHESDA, MD 20892

Security class (U,C,S,TS) : ONR resident rep. is ACO (Y/N): N
Defense priority rating : supplemental sheet
Equipment title vests with: Sponsor GIT X
NO EQUIP MAY BE PURCHASED IN LAST 6 MONTHS OF APPROVED GRANT PROJECT PERIOD

Administrative comments -
INITIATION. 2ND YEAR OF GRANT APPROVED FOR SUPPORT FOR 3 YEARS.

12 / 88

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION

NOTICE OF PROJECT CLOSEOUT

Date 8/22/89

)ject No. G-42-605 Center No. R6328-1A0

)ject Director T. A. Salthouse School/Lab Psychology

)nsor DHHS/PHS/NIH

tract/Grant No. 5 R01 AG06858-02 GTRC XX GIT

me Contract No. N/A

le Effects of Age on Spatial Abilities Among Engineers

ective Completion Date 5/31/89 (Performance) 8/31/89 (Report

seout Actions Required:

- None
- Final Invoice or Copy of Last Invoice
- Final Report of Inventions and/or Subcontracts
- Government Property Inventory & Related Certificate
- Classified Material Certificate
- Release and Assignment
- Other

ludes Subproject No(s).

project Under Main Project No.

tinues Project No. G-42-629 Continued by Project No. G-42-642

tribution:

Project Director	X	Reports Coordinator (OCA)
Administrative Network	X	GTRC
Accounting	X	Project File
Procurement/GTRI Supply Services	2	Contract Support Division (OCA)
Research Property Management		Other
Research Security Services		

SECTION IV PROGRESS REPORT SUMMARY	GRANT NUMBER AG06858-03	
PRINCIPAL INVESTIGATOR OR PROGRAM DIRECTOR Timothy A. Salthouse	PERIOD COVERED BY THIS REPORT FROM	THROUGH
APPLICANT ORGANIZATION Georgia Institute of Technology	06/01/88	5/31/89

TITLE OF PROJECT *(Repeat title shown in item 1 on first page)*
Effects of age on spatial abilities among engineers.

(SEE INSTRUCTIONS)

1. Plans for the next year. A major activity in the next year will be the development of a new molar criterion task, and accompanying molecular tasks, to be administered to samples of unselected adults and engineers or architects. New tasks are desirable because the results of the studies conducted in the past year suggest that significant age differences are evident in the previous criterion task, ThreeD, even among experienced architects. A key requirement of the proposed Molar Equivalence - Molecular Decomposition procedure is that there are little or no age differences in the criterion task in order to allow examination of possible age differences in a variety of molecular components of that task. An alternative criterion task in which samples of experienced adults can be found for which there is no relation between age and performance is therefore needed.

2. Studies conducted. Four projects were conducted under this research grant in the past year. One project consisted of completing the study initiated last year in which young adults with varying levels of spatial ability participated in five experimental sessions for the purpose of identifying determinants of spatial visualization ability. Only young adults were included in this project because of the desire to identify predictors of individual differences in spatial visualization ability among individuals within a relatively narrow range of ages. Some important factors have been identified (e.g., ability to preserve information during transformations), but more research is desirable before using this information as the basis for examining possible differences in the manner in which young and old experts achieve their expertise.

A second project completed in the past year consisted of three related studies, one involving unselected adults between 20 and 70 years of age, one involving 10 unselected older adults and 10 older architects, and the third involving 47 architects between 21 and 71 years of age. The first study revealed that there were substantial negative correlations between age and performance on paper-and-pencil tests of spatial visualization (e.g., Paper Folding, Surface Development, Form Board, and Cube Comparisons) among unselected adults. The second study indicated that older architects performed better than their unselected age peers on most measures of spatial visualization ability. The results of this second study could have been attributable either

to the occupational experience of the architects preserving spatial abilities that would otherwise decline, or to performance differences between architects and unselected adults reflecting ability differences that existed at early ages. These alternatives were investigated in the third study in which architects of different ages were tested with a variety of spatial visualization measures. The results of this study indicated that the age-related decline in spatial visualization performance among the architects was nearly identical to that of unselected adults, and therefore the interpretation that extensive experience preserved high levels of ability was not supported. In both of the latter two studies, it was also found that older architects performed at lower levels of accuracy in the ThreeD criterion test designed to assess overall ability to interpret technical drawings of three-dimensional objects.

A third study was conducted to determine whether age differences in spatial visualization abilities would be evident among instructors of courses in engineering graphics. A short questionnaire containing several problems requiring isometric sketches from orthographic views was mailed to over 400 members of a professional engineering graphics organization, with 159 of them completed and returned. Analyses of the quality of the drawings and the reported time to complete the drawings indicated virtually no relation between age (range from 21 to 84 years) and either drawing quality or drawing time. These data suffer from a probable selection bias, and the reporting of time was subjective, but they are nonetheless consistent with the possibility that within certain populations, experience may contribute to the maintenance of abilities that would otherwise decline.

The fourth project initiated during the past year is still in progress. This project involves the administration of a battery of paper-and-pencil tests of spatial visualization, inductive reasoning, and perceptual speed, along with a questionnaire designed to assess the individual's amount of experience with activities requiring spatial visualization (e.g., building models, using patterns to make clothes, producing or interpreting technical drawings of three-dimensional objects). Participants are being recruited from newspaper advertisements, with the goal of eventually testing over 300 adults between 20 and 80 years of age. It is hoped that the research participants can be stratified with respect to spatial experience, and that age trends on the various measures can then be examined within each experience grouping. If extensive experience modifies the effects of aging, then one should expect an age X experience interaction with smaller age-related effects on the spatial visualization measures among the individuals with the greatest amount of spatial visualization experience.

No substantial changes will be made from the human subjects protocols described in the original proposal.

The following manuscripts summarizing the results of this project have been submitted for publication, and are currently under editorial review.

Salthouse, T.A., Babcock, R.L., Skovronek, E., Mitchell, D.R.D., & Palmon, R. Age and Experience Effects in Spatial Visualization.

Salthouse, T.A., Babcock, R.L., Mitchell, D.R.D., Palmon, R. & Skovronek, E. Sources of Individual Differences in Spatial Visualization Ability.